

**Before the  
FEDERAL COMMUNICATIONS COMMISSION  
Washington, D.C. 20554**

In the Matter of	)	
	)	
WorldVu Satellites Limited	)	SAT-LOI-20170301-00031; Call Sign S2994
	)	
Audacy Corporation	)	SAT-LOA-20161115-00117; Call Sign S2982
	)	
ViaSat, Inc.	)	SAT-PDR-20161115-00120; Call Sign S2985
	)	
Theia Holdings A, Inc.	)	SAT-AMD-20170301-00029; Call Sign S2986
	)	
NGSO-Like Satellite Applications or Petitions for	)	
U.S. Market Access in the 37.5-40.0 GHz, 40.0-	)	
42.0 GHz, 47.2-50.2 GHz and 50.4-51.4 GHz Bands	)	

**COMMENTS OF SES S.A. AND O3B LIMITED**

SES S.A. (“SES”) and its subsidiary O3b Limited (“O3b”), hereby comment on the above-captioned non-geostationary orbit (“NGSO”) satellite license applications and requests for authority to serve the U.S. market (collectively, the “V-band NGSO Filings”).<sup>1</sup> Prior to acting on the V-band NGSO Filings, the Commission must ensure that each applicant has demonstrated how it will protect geostationary orbit (“GSO”) networks from interference. In addition, the Commission must impose clear requirements regarding any future NGSO system’s obligation to share spectrum with other co-frequency NGSO operations. Finally, any authorizations issued must include terms and conditions consistent with those imposed in other bands on other NGSO operators, including O3b.

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<sup>1</sup> *Audacy Corporation*, File No. SAT-LOA-20161115-00117 (the “Audacy Application”); *WorldVu Satellites Limited*, SAT-LOI-20170301-00031 (the “OneWeb Petition”); *ViaSat, Inc.*, File No. SAT-PDR-20161115-00120 (the “ViaSat Petition”); *Theia Holdings A, Inc.*, File No. SAT-LOA-20161115-00121 (the “Theia Application”).

## BACKGROUND

SES, one of the world's largest commercial communications satellite operators, is uniquely positioned to address issues raised by the V-band NGSO Filings because its facilities include both GSO and NGSO satellite fleets. SES entities operate more than 50 GSO satellites able to reach 99% of the world's population, many of them pursuant to Commission authority. SES subsidiary O3b provides high-throughput, low-latency connectivity via an NGSO satellite network authorized to serve the U.S.<sup>2</sup> that combines satellite reach with fiber optic speed, delivering the performance of fiber in places terrestrial networks do not reach, and making affordable broadband connectivity possible for billions of consumers and businesses in nearly 180 countries. O3b currently operates twelve satellites in a Medium Earth Orbit ("MEO") configuration, and has requested authority for additional spacecraft and spectrum in order to accommodate growing demand for O3b's high-performance connectivity.<sup>3</sup>

The V-band NGSO Filings seek Commission authority for new NGSO fixed-satellite service ("FSS") systems that would operate in the 37.5-40.0 GHz, 40.0-42.0 GHz, 47.2-50.2 GHz and 50.4-51.4 GHz Bands (collectively the "V-band"). While the Commission does not have service rules for the V-band, the band may also be used by GSO satellite systems. As other FSS bands become increasingly saturated, access to V-band spectrum is critical to permit expansion of existing GSO and NGSO satellite services in response to customer demand. Accordingly, before acting on the filings, the Commission must ensure it has sufficient evidence that the proposed NGSO operations will be able to successfully co-exist both with future GSO

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<sup>2</sup> *O3b Limited*, Call Sign S2935, File Nos. SAT-LOI-20141029-00118 & SAT-AMD-20150115-00004, grant-stamped Jan. 22, 2015, corrected and re-issued June 2, 2015 (the "O3b Market Access Grant").

<sup>3</sup> *O3b Limited*, Call Sign S2935, File Nos. SAT-MOD-20160624-00060; SAT-AMD-20161115-00116; & SAT-AMD-20170301-00026.

operations and with other NGSO systems. Any grants issued must also include terms and conditions similar to those applied to O3b and other NGSO FSS systems in other bands.

**I. ADDITIONAL INFORMATION AND APPROPRIATE CONDITIONS ARE NEEDED TO ENSURE GSO OPERATIONS ARE PROTECTED**

As discussed above, the bands identified in the above captioned proceeding are available for use by GSO and NGSO systems. The Commission cannot permit NGSO systems to operate in these bands unless it has adequate sharing mechanisms in place to ensure that the NGSO systems in the V-band will protect future GSO satellite networks from interference.

As noted by several filers,<sup>4</sup> there are no Commission rules in place to facilitate sharing between GSO and NGSO systems in the V-band. Similarly, the International Telecommunication Union (“ITU”) has not yet defined a technical mechanism to facilitate V-band GSO and NGSO systems sharing frequencies. Currently, No. **22.2** of the ITU Radio Regulations applies in V-band frequencies, specifying that NGSO systems shall not cause unacceptable interference to, or claim protection from, GSO networks. O3b is supporting efforts pursuant to Resolution **159 (WRC-15)** to develop approaches for spectrum sharing between GSO and NGSO satellite systems in these frequencies and believes the Commission should look to that process for guidance as it contemplates rules to protect V-band GSO systems from NGSO interference.<sup>5</sup> The Commission should also defer the grant of any V-band application until the applicant demonstrates that its system will be capable of adequately protecting in-band GSO systems from aggregate interference.

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<sup>4</sup> See, e.g., Audacy Application, Narrative at 68; OneWeb Petition, Attachment A at 38; Theia Application, Technical Narrative at 17.

<sup>5</sup> See *O3b Limited*, Call Sign S2935, File No. SAT-AMD-20170301-00026 (the “O3b V-Band Amendment”), Technical Annex at 10.

The showing made by ViaSat is deficient in this regard because it does not sufficiently address or acknowledge the need to protect future V-band GSO systems. In its EPFD analysis, ViaSat does not provide any evidence that the ViaSat NGSO system will protect future GSO networks in the V-band from harmful interference.<sup>6</sup> In fact, the ViaSat filing appears to be totally silent on this issue. Prior to acting on the ViaSat Petition, SES and O3b encourage the Commission to require that ViaSat demonstrate how its NGSO system will comply with future aggregate EPFD limits to prevent interference to V-band GSO systems.

The Commission must take steps to develop and implement single entry and aggregate EPFD limits in V-band frequencies in order to prevent interference to future GSO networks. SES and O3b believe the Commission should consider applying relaxed EPFD values to portions of the V-band in order to facilitate NGSO deployment and services. NGSO systems using the same spectrum will need to work together to determine how they can manage their operations to avoid exceeding the applicable limits. Because it may be difficult for NGSO operators to reach agreement on these issues, the Commission must be prepared to step in as necessary to implement a solution that will constrain aggregate EPFD levels. Accordingly, any grants of the V-band NGSO Filings must incorporate single entry and aggregate EPFD compliance requirements and be subject to modification as necessary to keep aggregate interference levels from causing harm to future V-band GSO systems.

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<sup>6</sup> See ViaSat Petition, Technical Annex A at 21-22, Exhibit 1. ViaSat's EPFD analysis only addresses protecting GSO systems from aggregate interference from NGSO systems in Ka-band spectrum.

## **II. SHARING AMONG NGSO SYSTEMS CAN PRIMARILY BE ACHIEVED THROUGH COORDINATION, BUT BAND SEGMENTATION DURING IN-LINE EVENTS MAY BE NEEDED AS A LAST RESORT**

In response to the Commission’s Notice of Proposed Rulemaking for NGSO satellite systems (“NGSO NPRM”),<sup>7</sup> SES and O3b joined other commenters in supporting Commission proposals to facilitate sharing among NGSO systems by encouraging coordination agreements focused on avoiding in-line events, as described in Section 25.261 of the Commission’s rules.<sup>8</sup> We agreed that band segmentation should not be the first recourse in accommodating multiple NGSO systems but noted that dividing up the spectrum for the duration of an in-line event would be necessary in certain instances.<sup>9</sup> Moreover, SES and O3b urged the Commission to reject arguments that ITU priority should determine sharing status among NGSO systems authorized to serve the U.S. market.<sup>10</sup> The Commission should apply these policies for NGSO-to-NGSO sharing to the V-band NGSO Filings.

Section 25.261 currently only applies to the 18.8-19.3 GHz and 28.6-29.1 GHz frequency bands. In the NGSO NPRM, the Commission has proposed to expand the scope of Section 25.261 to apply to several other bands.<sup>11</sup> SES and O3b believe the Commission should

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<sup>7</sup> *Update to Parts 2 and 25 Concerning Non-Geostationary, Fixed-Satellite Service Systems and Related Matters*, Notice of Proposed Rulemaking, 31 FCC Rcd 13651 (2016).

<sup>8</sup> Comments of SES S.A. and O3b Limited in IB Docket No. 16-408, filed Feb. 27, 2017 (“SES/O3b NGSO NPRM Comments”) at 23-27; Reply Comments of SES S.A. and O3b Limited in IB Docket No. 16-408, filed Apr. 10, 2017 (“SES/O3b NGSO NPRM Reply Comments”) at 19-27 & n.85 (citing other comments).

<sup>9</sup> SES/O3b NGSO NPRM Comments at 24-25.

<sup>10</sup> SES/O3b NGSO NPRM Reply Comments at 26-27 & nn.118 & 120.

<sup>11</sup> NGSO NPRM, ¶ 23.

also consider including V-band spectrum in Section 25.261 in order to facilitate NGSO-to-NGSO sharing in V-band frequencies.

### **III. ANY GRANTS OF V-BAND NGSO FILINGS SHOULD INCLUDE STANDARD OPERATING CONDITIONS**

If the Commission determines that grant of a V-band NGSO Filing is in the public interest, it should include in the authorization conditions designed to ensure that the planned operations will be consistent with Commission policies and rules as well as with international coordination obligations. The Commission can look to the O3b Market Access Grant and the authorization recently issued for the OneWeb system<sup>12</sup> for appropriate language on these matters. In particular, the following condition paragraphs from the O3b Market Access Grant should be applied to any grants of the V-band NGSO Filings:

Preamble: Operations pursuant to the grant must comport with the legal and technical specifications set forth by the applicant or petitioner and with Federal Communications Commission rules not waived herein.<sup>13</sup>

Condition 2: Operations must comply with all coordination agreements.

Condition 3: Requirement to maintain and make available to the North American Defense Command ephemeris data for each satellite.

Condition 5: Requirement to comply with applicable PFD limits.

Condition 6: Requirement to comply with applicable EPFD limits.

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<sup>12</sup> *WorldVu Satellites Limited Petition for a Declaratory Ruling Granting Access to the U.S. Market for the OneWeb NGSO FSS System*, File No. SAT-LOI-20160428-00041, Order and Declaratory Ruling, FCC 17-77 (rel. June 23, 2017) (the “OneWeb Market Access Grant”).

<sup>13</sup> Under the specific circumstances presented, the Commission determined that including this language in the OneWeb Market Access Grant was unnecessary (*see id.* at 11 n.71), but SES and O3b note that this provision is standard in International Bureau space station license grants and market access authorizations. *See, e.g.*, SES Americom, Inc., File No. SAT-MOD-20170316-00051, granted June 14, 2017, Attachment to Grant at 1; SES Satellites (Gibraltar) Ltd., File No. SAT-PPL-20160512-0048, granted Dec. 7, 2016, Attachment to Grant at 2. Consistent with this precedent, the language should be included in any grants of the V-band NGSO Filings.

Condition 12: Designation of the means by which the system will share spectrum with other NGSO constellations issued prior to or as part of this processing round.

Grants should also include a provision similar to paragraph 26 of the OneWeb Market Access Grant specifying that authorizations granted are subject to modification in order to conform to future rules or policies adopted by the Commission.

The following conditions imposed on O3b should also be incorporated in grants of petitions seeking U.S. market access for foreign-licensed NGSO networks:

Condition 1: Limitation of services that can be provided to include only those covered by the WTO agreement.

Condition 11: Restrictions on the ability to reposition or activate satellites in the NGSO constellation without Commission approval.

Condition 15: Specification regarding the orbital debris regulatory framework for applicants relying on the orbital debris mitigation rules of other jurisdictions.

Incorporation of the above provisions is consistent with Commission rules and precedent and is necessary to ensure that operations pursuant to the V-band NGSO Filings will conform to applicable regulatory requirements.

#### IV. CONCLUSION

For the foregoing reasons, the Commission should require supplemental information and impose appropriate conditions to ensure that operations pursuant to the V-band NGSO Filings comply with future requirements for sharing with both GSO satellites and other NGSO systems. The Commission should employ its standard condition language in any grants issued in response to the filings.

Respectfully submitted,

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## CERTIFICATE OF SERVICE

I hereby certify that on this 17th day of July, 2017, I caused to be served a true copy of the foregoing “Comments of SES S.A. and O3b Limited” by first class mail, postage prepaid, upon the following:

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